

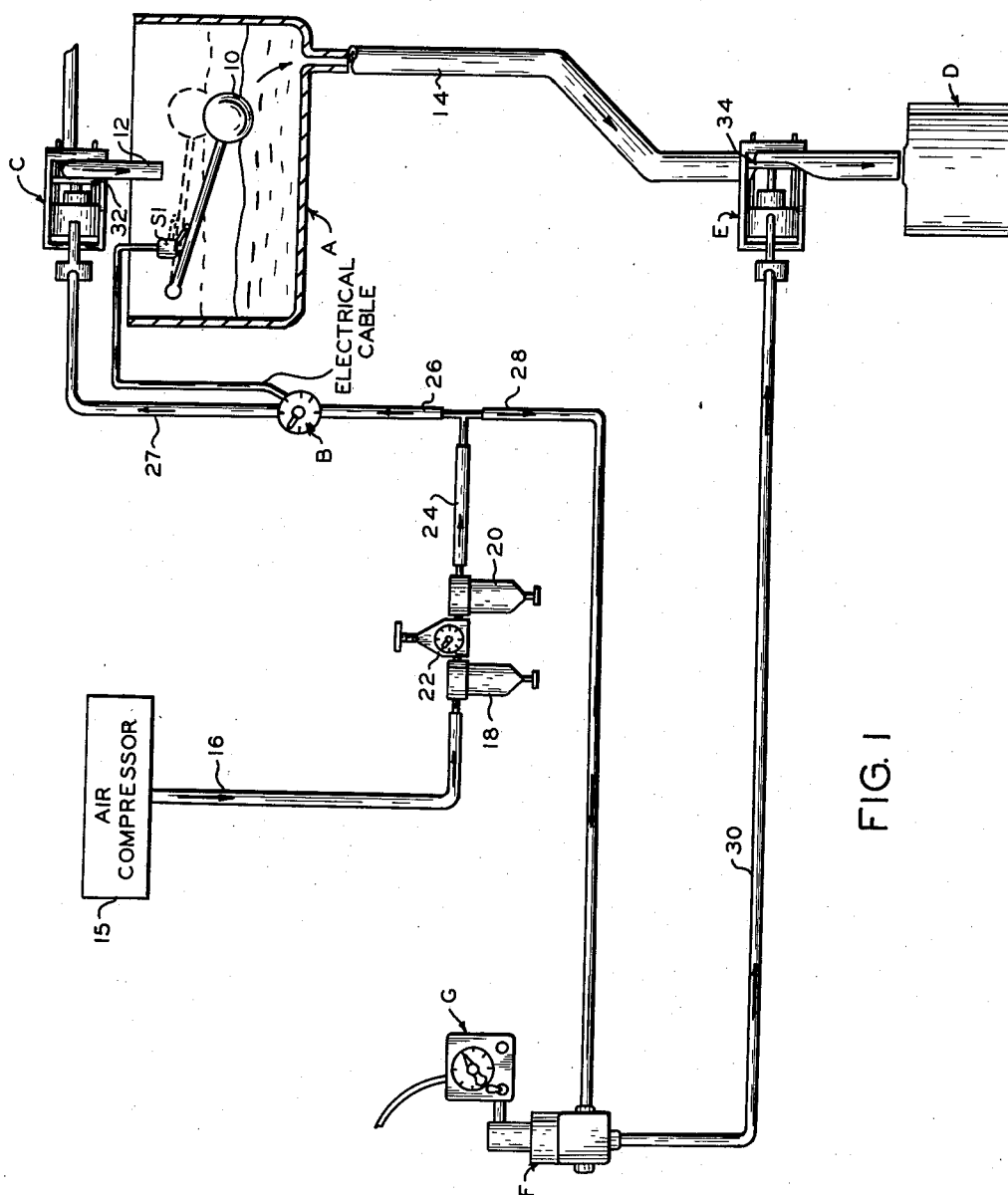
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DISPENSING APPARATUS FOR CORROSIVE LIQUIDS

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DISPENSING APPARATUS FOR CORROSIVE LIQUIDS

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Our invention relates to filling containers with corrosive liquids such as sulphuric acid.

In the loading of a container with corrosive materials such as sulphuric acid, (which is used in storage batteries) the quantity of sulphuric acid loaded into the container must be of a predetermined quantity. The reason for the predetermination of the quantity is that electric storage batteries are shipped without the liquid, but the predetermined quantity of acid is separably shipped. Then when the battery is to be used, the container with the predetermined amount of sulphuric acid is emptied into each cell of the storage battery. Remembering that each cell receives a predetermined quantity of acid, the container must be of such nature that it is not necessary for the person out in the field, such as army personnel, to pour unknown quantities of the sulphuric acid into the cell.

It also is well known that sulphuric acid has a tendency to corrode valves and electrical equipment. Hence, corrosion of valves and other movable machinery renders them inoperative.

Diluted acid creates a low resistance circuit which is dangerous to the workmen engaged in the filling of containers with sulphuric acid. Hence, to avoid danger to the workmen, we use air valves having a piston or ram. The use of an air valve eliminates fluttering or fibrillation. If the valve flutters, accurate dispensing of the corrosive material cannot be achieved.

Therefore, it is an object of our invention to provide for the loading of sulphuric acid to substantially the precise quantity at a rapid rate and wherein the machinery parts will not be subjected to the corrosive action of the corrosive liquid or its fumes.

Another object of our invention is to provide a system of accurately dispensing a predetermined quantity of corrosive fluid.

Other objects of our invention are to provide an improved device of the character described, that is easily and economically produced, which is sturdy in construction, and which is highly efficient in operation.

With the above and related objects in view, our invention consists in the details of construction and combination of parts, as will be more fully understood from the following description, when read in conjunction with the accompanying drawing, in which:

Fig. 1 is a schematic view showing the system for operating the unit.

Referring now in greater detail to the drawing, we show a container, generally designated as A, for holding sulphuric acid or other corrosive fluids. Within the sulphuric acid container A is a float 10 which actuates an electrical switch S1. The float 10 and switch S1 controls the flow of compressed air through an air controlled valve, generally designated as B, which in turn controls a ram or air compressor, generally designated as C. The ram C is adapted to compress a flexible acid ingress feed line 12 that feeds the corrosive liquid to the tank or reservoir A.

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An egress feed line 14, made of flexible tubing impervious to the effects of the corrosive liquid, from the storage reservoir A is adapted to fill a container, generally designated as D. A ram or air compressor, generally designated as E, controls the passage of fluid through the egress feed line 14.

An air compressor 15, is connected to a feed line 16 which is connected to filters 18 and 20 that remove moisture from the compressed air. The filters 18 and 20 are connected to each side of an air pressure gage 22 which is adapted to adjust the air pressure from the compressor. The compressed air, after being dehydrated, continues through the pipe 24 to pipes 26 and 28. The pipe 26 is connected to the valve B which is controlled by the float controlled electrical switch S1 to control the passage of acid into the acid reservoir A, and the pipe 27 leads to the one side of the ram C.

The compressed air passing through the pipe 28 passes through a time controlled valve, generally designated as F, which actuates the ram E. The ram E controls, at predetermined intervals of time, the passage of acid from the flexible egress feed line or tube into the container D. The time controlled valve F is connected to a timer G, which electrically actuates an armature to move the disk in the passageway within the valve F.

Because of the tendency of water to combine with the sulphuric acid, vapor corrosion is bound to occur. With our invention, we dehydrate the compressed air, thereby eliminating corrosion to the valves and the rams C and E.

The timer G is open for a predetermined period of time and then closed so that the quantity of acid poured into the container is predetermined.

The pipes or tubes should be made of acid or corrosive resistant material such as neoprene, and the system as hereinbefore explained, is able to operate for an extended period of time without the necessity of replacement of parts or of repair.

Although our invention is particularly described as being used in conjunction with sulphuric acid, it may be used industrially to dispense nitric, hydrochloric, phosphoric and acetic acid, boron trifluoride, ammonia, bleach.

The rams C and E have pistons 32 and 34 respectively, wherein the air comes from one side of the pipe 27 and the pipe 30 to press each piston in one direction only, the flexible acid feed line 12 and the flexible egress feed line 14, tends to press the piston backwardly when the air pressure is removed from one side of the piston.

Hence, the characteristics of the flexible tubing serves as part of the pressure release on the ram and in any explosive atmosphere there is no damage of a spark igniting the dangerous explosive atmosphere.

Although our invention has been described in considerable detail, such description is intended as being illustrative rather than limiting, since the invention may be variously embodied, and the scope of the invention is to be determined as claimed.

We claim:

1. A dispensing system for corrosive fluids comprising a dispensing tank having an inlet means and an outlet means, said inlet means being in fluid connection with a source of corrosive fluid and said outlet means being in fluid connection with a dispensing nozzle positioned to supply corrosive fluid from said tank to individual removable containers, said inlet means being operatively controlled by a first supply valve means interposed in the fluid connection between said inlet means and said source of corrosive fluid, and said outlet means being operatively controlled by a second supply valve means interposed in the fluid connection between said outlet means and said nozzle, each of said supply valve means comprising a valve housing in which is provided a movable plunger,

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each of said valve housings being in individual fluid connection with a source of compressed fluid for utilizing the compressed fluid to actuate their respective plungers, dehydrating means interposed in the fluid connection between said source of compressed fluid and each of said valve housings, a first control valve means interposed in the fluid connection between said first valve housing and said source of compressed fluid, a float means in said tank, said float means being operatively associated with an electrical switch to open and close said switch in accordance with the position of said float in said tank, said switch being in operative electrical circuit with said first control valve, a second control valve means interposed in the fluid connection between said second valve housing and said source of compressed fluid, and timing means operatively connected to said second control valve means to open and close said second control valve means in predetermined timed sequence.

2. The dispensing system of claim 1 wherein the fluid connections between said inlet means and said source

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of corrosive fluid and between said outlet means and said nozzle comprise flexible conduits, said flexible conduits coacting with the plungers in the respective supply valve means to move said plungers into respective predetermined valve-opening positions when compressed fluid is removed from the respective valve housings.

3. The dispensing system of claim 1 wherein said dehydrating means is provided in a conduit extending between said source of compressed fluid and a manifold, and conduits connecting said first and second supply valve means to said manifold for placing both said supply valve means in common connection with said dehydrating means.

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